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March 10, 2011

**Via Email**

James Arden Barnett  
Rear Admiral, USNR (Ret.)  
Chief, Public Safety & Homeland Security Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, S.W.  
Washington, D.C. 20554

**Re: February 17, 2011 Letter**

Dear Admiral Barnett,

Verizon understands the critical importance of providing reliable 9-1-1 services to 9-1-1 centers, also known as Public Safety Answering Points ("PSAPs"), and the community. Verizon has provided safe, reliable 9-1-1 service since it first became available in the 1970s and has been a dedicated partner of the Commission and the public safety community in quickly responding to major public safety events, including 9/11, Hurricane Katrina, and the earthquake in Haiti. Likewise, Verizon has long been engaged with stakeholders in the public safety community, technology vendors, and device manufacturers to advance emergency response communications and to provide innovative solutions, such as the deployment of IP-based, Next Generation 9-1-1 technologies. In light of the events of January 26, 2011, Verizon has redoubled its efforts to ensure that callers receive the level of service they deserve and expect when they call 9-1-1.

During the heavy snowstorm in the Washington D.C. metropolitan area on January 26, an extremely high number of wireless 9-1-1 calls were placed to PSAPs in Montgomery and Prince George's counties. This spike in wireless calls to 9-1-1 caused some trunks serving those PSAPs that carry calls from wireless carriers to be taken out of service for varying periods of time from around 5:45 to 11 p.m. During this time, Verizon was aware of the impact to the PSAPs' wireless trunks and focused its efforts on restoring those trunks to service. While Verizon was able to restore some trunks, the sustained high volume of wireless 9-1-1 calls caused many of the trunks to go back out of service until approximately 11 p.m., when the call volume diminished.

Since that date, Verizon has been working with the Montgomery County and Prince George's County PSAPs to analyze what occurred on January 26 and to discuss appropriate measures to prevent similar events from occurring in the future. Prior to the January 26 snowstorm, Verizon had already begun examining the relationship between a significant volume of wireless 9-1-1 calls, and its impact on PSAP trunks. Verizon has been working with equipment manufacturers to study the basis of that relationship in a lab and to devise a plan that would mitigate the impact on PSAPs.

This effort has allowed Verizon to implement its plan, which would prevent all but one of a PSAP's trunks from going out of service during episodes of high call volume. Verizon has recently tested this plan, confirmed that it is effective, and is working with various local and state officials to implement it, as appropriate. Verizon will keep the Commission apprised of the progress of those efforts.

### **January 26, 2011 Focused Overload**

On January 26, 2011, there was a severe snowstorm in the Washington D.C. metropolitan area that grew in intensity during the evening rush hour. Thousands of motorists were stranded on area roads causing widespread traffic jams. The region also experienced extensive power outages. This confluence of events led to a substantial number of wireless calls being placed to 9-1-1 in Montgomery and Prince George's counties. For instance, the Montgomery County PSAP has publicly stated that it answered over three times the typical volume of calls from 8 p.m. to 8:30 p.m. Verizon's network data not only confirms this volume, but also indicates that a significant number of calls were routed to busy treatment before any trunks were out of service because of the increased call volume.

Each call to a PSAP is delivered over a separate trunk. The network is designed for calls to route to busy treatment when there are more 9-1-1 calls than available trunks serving the PSAP. In general, Verizon works with PSAPs to design and engineer E9-1-1 trunk groups to provide the National Emergency Number Association's (NENA) P.01 Grade of Service standard, which is determined by the average busy hour of the average week during the busy season. NENA also periodically works with providers to study call-traffic patterns so that the industry is aware of any material changes and to consider whether the P.01 standard remains appropriate.

On January 26, the massive volume of wireless calls to 9-1-1 constituted what the industry refers to as a "Focused Overload." A Focused Overload "is generally directed toward a particular location and may result from media stimulation (news programs, advertising, call-in contests, telethons) or events that cause mass calling to government or public-service agencies, weather bureaus, or public utilities." Focused Overloads are not new events. For example, when they occur in the network (e.g., from customers dialing in to participate in a TV game show), network management controls can be used to limit the volume of calls from connecting to a specific destination. Verizon, however, does not employ such controls for 9-1-1 calls. As such, the volume of 9-1-1 calls is generally limited by the number of calls that a particular PSAP can answer (e.g., if a PSAP has ten 9-1-1 trunks connected to ten PSAP stations handling 9-1-1 calls, it can handle ten 9-1-1 calls at a given time). One development in the 9-1-1 sphere is that increasing numbers of customers use wireless phones to place calls to 9-1-1. Frequent redials from the same wireless phones, many of which facilitate quick re-dialing, can compound a Focused Overload on the trunks carrying wireless 9-1-1 calls to PSAPs.



On January 26, Verizon first observed a 9-1-1 PSAP trunk that carries calls from wireless carriers removed from service in Montgomery County at 5:45 p.m. When a trunk associated with the specific 9-1-1 Selective Routers used by Verizon to serve the counties is taken out of service, Verizon's technicians in its Network Operations Center (NOC) receive an alarm. During the January 26 storm, Verizon's NOC technicians were inundated with alarms, and these technicians worked to restore the trunks that were taken out of service. A number of trunks were restored, though many subsequently went back out of service due to the continued Focused Overload.

As a result of these efforts, while the PSAPs lost trunks that carry calls from wireless carriers for certain intervals of time, Verizon's data from the 9-1-1 Selective Router shows that some number of wireless calls to the Montgomery County and Prince George's County PSAPs were being delivered. By around 11 p.m., the number of wireless 9-1-1 calls had abated to the extent that all trunks could be restored to working condition. Verizon was able to restore all the 9-1-1 wireless trunks without replacing any physical hardware, such as common cards, line cards or racks.

Based on testing, Verizon has concluded that during Focused Overloads to PSAPs, what is known as a "double wink" failure caused the PSAP trunks that carry calls from wireless carriers to be removed from service during call setup. When a 9-1-1 Selective Router presents a new call to the PSAP over an idle trunk, the PSAP equipment (typically a PBX) is configured to respond with an "Off-Hook Wink" to indicate that it is able to receive the Automatic Number Identification (ANI) digits using Multifrequency (MF) Signaling Tones. If the wink is received within the standard sub-second time frame, the call completes.

Wink failures occur when a Selective Router presents a new call to the PSAP over an idle trunk and the PSAP PBX does not respond with a wink to signify its ability to receive the calling party's telephone number within the required time frame. If no wink is sent back to the 9-1-1 Selective Router within the maximum call setup time, it counts one no-wink condition for the trunk. During normal operations at the PSAP's average busy hour, if the 9-1-1 Selective Router detected a no-wink condition on a trunk, the call would be offered to the next available trunk in a round-robin fashion. Since another trunk is likely to be available, that trunk would respond with a wink and the call would be completed on the alternative trunk. But, if all the other trunks remain busy, as is often the case due to the high volume of calls during a Focused Overload, the same call will again be offered to the same trunk where there already has been a "no wink" condition. If this second offering results in a second no-wink condition (i.e., a "double wink" failure), the 9-1-1 Selective Router will remove that trunk from service because it concludes that a call cannot be completed on that trunk. When the trunk is taken out of service, an alarm will be presented in Verizon's NOC, and a technician will investigate the cause of the trunk failure and attempt to restore it.

With the removal of each trunk, there is a reduction of the call-handling capacity of the specific group of trunks serving the PSAP. If the Focused Overload event persists, all trunks within the affected trunk group could potentially be taken out of service.

The same company manufactures the PBX equipment that Montgomery and Prince George's counties use. The age and/or version of such equipment vary, but appear to have had no effect on the susceptibility of the PBX to wink failures. Newer equipment, such as Montgomery County's PBX, may contain more features, such as being IP-ready, and perform more functions. But, the functionality associated with sending winks to the 9-1-1 Selective Router appears to be unchanged from older PBXs. Although Verizon has noted wink failures only in instances in which traffic is delivered to PBXs from the type of Selective Router used in Montgomery and Prince George's counties, Verizon is considering testing another commonly used router, which also utilizes winks in its call setup operations, in its lab.

Finally, Focused Overloads are not unique to the Washington D.C. region. They could occur in other geographic areas as well, whether those areas are served by Verizon or another provider. In June 2010, Verizon observed what it later determined to be a Focused Overload that impacted a PSAP in another state during a severe weather event. Subsequently, Verizon began working to understand what occurred and to develop a remediation plan. Verizon has had discussions with the PBX and Selective Router vendors, as well as NENA, to further its understanding. In August, Verizon began studying the event in Verizon's lab. Verizon has recreated a Focused Overload in its lab during which the PBX did not respond in the allotted time and has tested several proposed fixes. Verizon observed Focused Overloads in the same state in December and February. During the latter event, Verizon was able to test the remediation and communications plans described below and to verify that they work.

### **Remediation**

After consultations with equipment manufacturers and examining the impact of Focused Overloads in Verizon's test lab, Verizon has developed a remediation plan that it is now offering all the PSAPs it serves.

Specifically, Verizon recommends to PSAPs that a Selective Router trunk group setting, known as the "automatic busy percentage" setting, be changed to allow only a single trunk in a group to be removed from service automatically due to wink failures. When a single trunk is out of service, it will signal a critical alarm in Verizon's NOC, which will require a technician to test all the trunks to the PSAP to determine if they are working properly. This testing will allow the technician to determine if the alarm is related to a Focused Overload and all trunks should remain in service. However, if the alarm is not related to a Focused Overload and the trunks fail diagnostic tests, the trunks will be taken out of service and calls will be rerouted, if possible. It is important to note that even with this remediation plan, during a Focused Overload, a number of wireless 9-1-1 calls will still receive busy signals if there are more calls than available trunks.

Verizon has prepared a Technical Bulletin (Attachment 1) that describes the remediation plan and has distributed it to all Maryland PSAPs, as well as the Maryland Emergency Number

Systems Board. Verizon will send the bulletin to all the PSAPs it serves and intends to implement the plan, as appropriate, with all the PSAPs as soon as practicable.

Verizon and the equipment manufacturers are continuing work in the lab to examine alternatives because certain PSAPs may choose not to implement the remediation plan. For example, some PSAPs have automatic alternate routing to call takers when a trunk is removed from service for certain reasons unrelated to a Focused Overload, such as from a cable cut. For PSAPs that adopt the remediation plan, the rerouting would not take place automatically because trunks would not automatically be taken out of service. To address such a situation, a technician in the NOC will respond quickly to an alarm and, if appropriate, will manually take trunks out of service to reroute the calls. As a result, PSAPs unlikely to experience Focused Overloads, such as PSAPs with less dense populations, may want to consult further with Verizon to consider their options.

Finally, to date, Verizon has only observed Focused Overloads causing wink failures of CAMA (Centralized Automatic Message Accounting) trunks. CAMA trunking technology has had widespread support across many platforms within the industry for many years. CAMA trunks were originally designed to provide a method for delivering the calling (originating) number from End Office to Toll Office that enabled automatic recording of call time and duration. In the 9-1-1 context, the numeric digits that reflect the calling number are relayed across the CAMA trunk to the PSAP. CAMA trunks utilize in-band signaling for call setup, which causes the Selective Router to remove a CAMA trunk from service if call setup is not accomplished (e.g., due to a double wink failure). SS7, PRI, and IP-trunking, which rely on out-of-band signaling for call setup, do not remove trunks from service for that reason.

While Verizon will consider the implication of replacing CAMA trunks with IP-based trunks/Next Generation 9-1-1 (NG911) architecture, it is important to recognize the breadth of such a proposal and the substantial impact it would have on PSAPs by requiring them to make significant expenditures on equipment, facilities, and training while many are already experiencing funding issues.

Verizon shares the Commission's vision of NG911 being available to the entire nation, but cautions that much work remains to be done to develop industry standards and to promote the widespread adoption of NG911 by PSAPs. Verizon is willing to assist in that work as it has long been actively engaged in the industry effort to develop standards for NG911. Verizon is also a market leader in helping move PSAPs to its IP network. For example, Verizon recently announced an effort to combine its global IP network and managed and professional services with Intrado's advanced 911 technologies to deliver calls and data services to PSAPs via an IP-enabled communications platform that will be able to support emerging and future capabilities, such as consumers sending photos, videos and text messages. Verizon will provide these services to the Denco Area 911 District in North Texas in June and intends to offer these services nationwide later in 2011.



### **Improved Communication with PSAPs**

On February 18, 2011, Verizon implemented a new procedure to ensure that an affected PSAP is notified even more quickly after Verizon becomes aware that even a single 9-1-1 trunk is out of service. This notification will occur whether or not there is a Focused Overload event and whether or not a particular PSAP is implementing the technical plan explained above. Verizon's goal is to notify the PSAP within 15 minutes of such an event. Of course, such immediate notifications will be preliminary since Verizon may not yet have many details on the nature of the particular problem at hand. In such cases, Verizon plans to follow up with the PSAPs to update them once the investigation has been completed.

Similarly, Verizon will notify a PSAP customer when Verizon has an indication that a Focused Overload event is occurring. That is, Verizon will continue to manage the network trouble that the alarm(s) may indicate, but will not delay getting a notification out to the PSAP even before Verizon knows all of the details. This change, coupled with the technological adjustments noted, will help keep services functioning during that event, and will provide PSAP customers with more timely notice of service issues. Verizon will also prioritize notification for other indicated abnormal or reportable alarms related to trunks being out of service. For example, in a situation with multiple alarms for the 9-1-1 network, Verizon's NOC will contact the Verizon customer care center with the details then available about the alarms (though they will be preliminary and subject to further analysis); the customer care center will then be able to communicate more quickly to the PSAP. Depending on the scope of the alarms and service troubles, Verizon's 9-1-1 customer care center can engage the assistance of additional Verizon personnel, such as a 9-1-1 technical service manager, to assist in notifying multiple PSAPs as needed.

Verizon also has implemented another change to its communications processes that will help alert the PSAP customer to a Focused Overload event. If the Network Operations Center receives alarms that indicate that a link failure occurs more than five times in any five-minute period, and unless another cause is already indicated, Verizon will begin internal diagnostics for a possible Focused Overload event. In addition, the NOC will inform Verizon's customer care center of the alarm so the care center can notify affected PSAPs. This change will allow for more timely Verizon communications with the PSAPs.

Verizon is continuing to investigate other ways to provide enhanced (and potentially automated) notifications to the PSAPs of trunks being out of service. It would require substantial development to create a system that allows PSAPs to view NOC data, including alarms when trunks are not in service, in real-time. Rather than spending resources retrofitting existing installations, it may make more sense to enable such capabilities in the context of migration to NG911 serving arrangements. In light of Verizon's new procedures to enhance communication with the PSAPs and the costs to PSAPs for systems providing real time NOC data, the demand for such services is unclear. Today, some PSAPs purchase aftermarket products that provide trunk

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status data, but that is not tied into Verizon's NOC data. Nonetheless, Verizon will continue to examine this issue.

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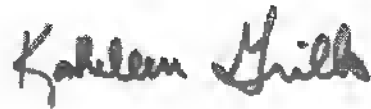
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Verizon understands the Commission's interest in this matter. We will continue to work cooperatively with the PSAP community to ensure that callers receive the level of service they deserve and expect when they call 9-1-1.

Please contact me if you have any questions.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Kathleen Grillo". The signature is written in a cursive, flowing style.

Attachment